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L4: Entry 5 of 34 File: USPT Aug 20, 2002

US-PAT-NO: 6436150
DOCUMENT-IDENTIFIER: US 6436150 B1

TITLE: Fabric protectant against pests

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

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Sugano; Masayo	Osaka			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Sumitomo Chemical Company, Limited	Osaka			JP	03

APPL-NO: 09/ 252240 [PALM]
DATE FILED: February 18, 1999

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	10-035782	February 18, 1998

INT-CL: [07] A01 N 65/00, D06 M 13/00

US-CL-ISSUED: 8/115.6; 424/403, 424/725, 424/733
US-CL-CURRENT: 8/115.6; 424/403, 424/725, 424/733

FIELD-OF-SEARCH: 8/115.6, 424/403, 424/195.1, 424/725, 424/733

PRIOR-ART-DISCLOSED:

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Search Selected Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5839224	November 1998	Emerson et al.	424/403

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
3901341	July 1990	DE	

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Chemical Abstracts, vol. 119, No. 9, Aug. 30, 1993, Columbus, Ohio, US; abstract No. 88945, Okano, Takayoshi: "Nontoxic Insect repellent compositions for protecting clothes from damage by moth and other insects", XP002101875 * abstract * & JP 05 097618 A (Osaka Seiyaku KK, Japan).
Data Base Cropu, Plarre Et Al.: "Effects of oil of cloves and citronellol, two commercially available repellents, against the webbing clothes moth Tineola bisselliella Hum." XP002101876 * abstract * & Anz. Schaedlingskd. Planz. Umweltschutz, vol. 70, No. 3, 1997, pp. 45-50.

ART-UNIT: 1651

PRIMARY-EXAMINER: Lilling; Herbert J.

ATTY-AGENT-FIRM: Fitch, Even, Tabin & Flannery

ABSTRACT:

A fabric protectant comprising of a carrier and a plant oil selected from the group consisting of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove oil, star anise oil, milfoil oil, fennel oil, oregano oil and angelica oil, efficaciously controls fabric-related pests. In addition, a method of protecting fabric which comprises dispersing, spraying, spreading and setting an effective amount of the plant oil selected from the group given above is an excellent method to control fabric-related pests.

9 Claims, 0 Drawing figures
Exemplary Claim Number: 1

BRIEF SUMMARY:

1 FIELD OF THE INVENTION

2 The present invention relates to a fabric protectant that has a plant oil as an active ingredient.

3 BACKGROUND OF THE INVENTION

4 A fabric protectant is usually deployed to keep treated fabric unencumbered from certain damages. One of the damages a fabric material may encounter is related to pests. An assortment of pests are known to damage fabrics by means such as feeding upon the fabric material. Clothing may be victim to these fabric-related pests and a fabric protestant against the said fabric-related pests would be an advantage.

5 SUMMARY OF THE INVENTION

6 The objective of the present invention is to serve a fabric protectant that efficaciously controls fabric-related pests. The plant oils of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove bud oil, star anise oil, milfoil oil and fennel oil surprisingly control fabric-related pests efficaciously and, therefore, are utilized to produce the fabric protectant of the present invention.

7 DETAILED DESCRIPTION OF THE INVENTION

8 The fabric protectant of the present invention comprises a specific plant oil. The plant oil utilized in the present invention (hereinafter, the present oil), which is selected from the group consisting of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove bud oil, star anise oil, milfoil oil and fennel oil, oregeno oil and angelica oil. The plant oils utilized in the present invention are standardly essential oils. Therefore, horseradish oil can be obtained by steam distillation of horseradish (Cochlearia armoracia), bay oil can be obtained by steam distillation of bay (Pimenta racemosa) leaves, basil oil can be obtained by steam distillation of basils (Ocimum spp.), calamus oil is can be obtained by steam distillation of sweet flag (Acorus calamus) rhizomes, ginger oil can be obtained by steam distillation of ginger (Zingiber officinale), palmarosa oil can be obtained by steam distillation of rosha grass (Cymbopogon martinii), cinnamon oil can be obtained by steam distillation of cassia or cinnamon (Cinnamomum spp.) trees, scrubs, barks or leaves, ylang-ylang oil can be obtained by steam distillation of ylang-ylang (Cananga odorata) flowers, perilla oil can be obtained by steam distillation of Perilla spp. leaves, flowers or seeds, valerian oil can be obtained by steam distillation of garden heliotrope (Valeriana officinalis) rhizomes, clove oil can be obtained by steam distillation of clove (Eugenia caryophyllata) buds, stems or leaves, star anise oil can be obtained by steam distillation of star anise (Illicium verum) fruits or leaves, milfoil oil can be obtained by steam distillation of milfoil (Achillea millefolium), fennel oil can be obtained by steam distillation of wild marjoram (Origanum vulgare) and angelica oil can be obtained by steam distillation of Angelica spp. Each present oil may be extracted from the botanical source according to the methods disclosed in Kouryou Kagaku Souran (Okuda; Hirokawa shoten publication, 1967). It is also possible to purchase plant oils from the market.

9 The fabric protectant sets forth efficacious activity against fabric-related pests which mainly damage fabrics. Examples or fabric related pests include Tinea such as case-bearing clothes moth (tinea translucens) and casemaking clothes moth (Tinea pellionella), Tineola such as common clothes moth and webbing clothes moth (Tineola bisselliella), Attagenus such as black carpet beetle (Attagenus unicolor japonicus) and Attagenus unicolor, Anthrenus such as varied carpe beetle (Anthrenus verbasci), Hofmannophila such as brown house mouth (Hofmannophilia pseudospretella), Endrosis such as white-shouldered house moth (Endrosis sarcitrella), and Dermestes such as hide beetle (Dermestes maculatus), larder beetle (Dermestes lardarius), Dermestes haemorrhoidalis and Dermestes perunvinus.

10 Formulations of the fabric protectant may comprise of carriers, in addition to the present oils, but a formulation solely comprising one or more of the present oils is also effective. Cream formulations and liquid formulations such as an aerosol, are examples of formulations that comprise a carrier. A formulation comprising resins usually comprises synthetic resins that were previously impregnated with any present oil. Furthermore, a gel formulation and formulation comprising of paper or bisques wherein the paper or bisque is previously impregnated with any present oil, are also possible formulations of the fabric protectant. Dissolving the plant oil or oils in a appropriate solvent, such as acetone, is a suitable means to impregnate the paper in formulating the formulation comprising an impregnated paper. The fabric protectant usually utilizes formulations comprising the carrier.

11 Suitable carriers for the liquid formulation include water; alcohols such as methanol, ethanol, glycerin and polyethylene glycol, ethers such as tetrahydrofuran and dioxane; aliphatic hydrocarbons such as hexane, kerosene, paraffin and petroleum benzine; or esters such as ethyl acetate.

12 Suitable carriers for the cream formulation include hydrocarbons such as liquid paraffin, vaseline and solid paraffin; silicones such as dimethylsiloxane, colloidal silica and bentonite; alcohols such as ethanol, stearyl alcohol, lauric alcohol, polyethylene glycol, glycerin; carboxylic acids such as lauric

acid and stearic acid; bees wax; and esters such as lanolin.

13 The formulations comprising a carrier, such as the liquid formulation and cream formulation, may also additionally comprise auxiliary agents such as emulsifiers, spreading/wetting agents, suspensible agents, preservatives and propellants, or coating agents. More specifically, examples of emulsifiers include soaps, polyoxyethylene fatty acid alcohol ethers such as polyoxyethylene oleyl ether, polyoxyethylenealkyl aryl ethers such as polyoxyethylenenonyl phenyl ether, polyoxyethylene fatty acid esters, fatty acid glycerides, sorbitan fatty acid esters, higher alcohols sulfates and alkylarylsulfonic acid salts such as sodium dodecylbenzenesulfonate; spreading/wetting agents include glycerin and polyethylene glycol; suspensible agents include casein, gelatin, alginic acid, carboxymethylcellulose, gum arabic, hydroxypropylcellulose and bentonite; perservatives include methyl p-hydroxybenzoate, ethyl p-hydroxybenzoate, isopropyl p-hydroxybenzoate and butyl p-hydroxybenzoate; propellents include dimethyl ether, chlorofluorocarbons and carbon dioxide; and coating agents include nitrocellulose, acetylcellulose, acetylbutylcellulose, methylcellulose derivatives, polyvinyl alcohols and vinyl resins such as vinyl acetate resins.

14 Examples of synthetic resins for the formulation comprising resins (hereinafter, resin formulation) include polyethylene; polypropylene; a copolymer composition of ethylene and a monomer that comprises a polar group, such as an ethylene-vinylacetate copolymer, ethylene-methyl(meta)acrylate copolymer, ethylene-ethylacrylate copolymer and ethylene-vinylacetate-methyl(meta)acrylate copolymer; and synthetic resins comprising chlorine atom(s), such as polyvinylchloride and polyvinylidenechloride. The ethylene-vinylacetate copolymer and ethylene-methyl(meta)acrylate copolymer are the preferable synthetic resins, because ethylene-vinylacetate copolymer and ethylene-methyl(meta)acrylate exceed in moldability under a relatively low heat condition, as well as the ability to retain, diffuse, and stabilize the plant oils.

15 The synthetic resins may comprise the plant oils by means of impregnating the essential oil to the said resin. Methods of impregnation include, the present oil itself impregnating the synthetic resin, dissolving the present oil in an appropriate solution such as acetone and then impregnating the synthetic resin with the obtained solution, or a method wherein a concentrated master pellet is formed.

16 In the master pellet method, one or more of the present oils in the liquid state is incorporated to the synthetic resins, and then mixed. The mixed solution may be diluted to the appropriate concentration, if necessary, with additions of synthetic resin and formed to the objective mold such as a film, sheet and net. Methods of forming the obtained synthetic resins include the injection molding method utilized by heat-treated resins, inflation molding or spinning.

17 The amount of the present oils within the formulations mentioned earlier differs upon the use and formulation variation, but the liquid or cream formulations may comprise the present oils from 0.1 to 50% by weight, preferably from 1 to 20% by weight. It is standard for the resin formulation to comprise the present oils from 1 to 40% by weight, and preferably from 5 to 30% by weight. The pest repelling activity will not be efficient if the resin formulation lacks the present oils by 1% by weight. An unfavorable tacky sensation, such as adhesion, procures when the resin formulation comprises the present oils at more than 40% by weight because of the tendency for the present oils to bleed at the surface of the molding.

18 The present protectant may further comprise of other pesticides, pest repellents, synergists, anti-oxidants and UV-absorption agents, as well as other additional agents such as fragrances, dyes and pigments.

19 Examples of the pesticides include empenthrin (1-ethynyl-2-methyl-2-pentenyl-d-cis, trans-chrysanthemate(cis:trans

ratio=2:8)), 1-ethynyl-2-fluoro-2-pentenyl d-trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate and transfluthrin. Examples of the pest repellents include caran-3,4-diol, DEET, p-menthane-3,8-diol, 2, 3,4,5-bis(.DELTA..sup.2 -butylene)tetrahydrofurfural, di-n-proylisocicholonate, di-n-butyl succinate, 2-hydroxyoctylsulfide and (N-carbo-sec-butyloxy)-2-(2'-hydroxyethyl piperidine). An example of the surfactants is N-(2-ethylhexyl)-8,9,10-trinorborn-5-ene-2,3-dicarboxyimide (MGK-264). Examples of the anti-oxidants include butylhydroxyanisole, dibutylhydroxytoluene, tocopherol, and .gamma.-orizanole.

20 The fabric protectant may be utilized by dispersing, spraying, spreading or setting within any appropriate area wherein pest controlling activity is deemed necessary. Dressers, drawers, cases and closets are areas wherein a fabric-related pest may invade. Furthermore, the fabric protectant may also be utilized by wrapping clothing around the fabric protectant such as paper or resin moldings that comprise the present oils.

DETAILED DESCRIPTION:

1 EXAMPLES

2 Hereinafter, the formulation and test examples further explain the present invention, but does not limited the present invention in anyway. Hereinafter, parts represents parts by weight.

3 Formulation Example 1

4 Each present oil was formulated into an aerosol by the following procedure.

5 Ten (10) parts of a present oil are dissolved in ethanol to make the complete body 35 parts, and are packed into an aerosol device. After a valve is attached to the each aerosol device, 65 parts of a 1:1mixture comprising of freon 11and 12 is charged through the valve portion under pressure to acquire an aerosol.

6 Formulation Example 2

7 Ten (10) parts of stearic acid, 2 parts of cetyl alcohol, 1 part of laonoline, 2 parts of liquid paraffin and 62 parts of water are added to 10 parts of horseradish oil. After the said mixture is heated, melted and mixed, 13 parts of glycerin are further incorporated and well mixed to acquire a cream formulation.

8 Formulation Example 3

9 Each present oil was formulated into a pellet and subsequently molded to a 1 mm thick sheet, by the following procedure.

10 Thirty (30) parts of a present oil and 70 parts of ethylene-methylmetacrylate copolymer (Sumitomo Chemical Company, Acrylift WH202) are stirred by using a closed pressurized kneader for 15 minutes and then formed into a master pellet. A hundred (100) parts of the master pellet and 200 parts of the matrix resin of ethylene-methylnetacrylate copolymer are stirred in a closed pressurized kneader for 15 minutes, fed into an extruder and have hot cuts performed while being extruded. A pellet comprising 10% by weight of a present oil is obtained. The pellet was then molded with a T die extrusion machine to acquire a 1 mm thick sheet.

11 Formulation Example 4

12 Each present oil is formulated into a formulation comprising an impregnated paper, by the following method.

13 A thousand micrograms (1000 .mu.g) of a present oil is dissolved in an

appropriate amount of acetone, uniformly spread on a 2 cm.times.2 cm filter paper with a thickness of 0.3 mm and then dried with acetone. A formulation comprising an impregnated paper is acquired.

14 The effectiveness of the present oils as an active ingredient is set forth in the test examples. All the horseradish oil utilized in the test examples are available from the market (Takasago International Corporation).

15 Test Example 1

16 Each present oil was tested by the following procedure.

17 One-tenth milliliter (0.1 ml) of an acetone solution comprising 1% by weight of a present oil is impregnated to 1 cm.times.1 cm muslin wool fabric and the impregnated wool fabric is placed on the bottom area of a plastic cup with a volume of 60 cm.sup.3. Subsequently, a cover comprising of a 1.5 cm diameter hole was placed on the cup. The cup was then placed on the floor within a 20 cm.times.20 cm.times.28.5 cm nylon gauze cage. The cage was infested with an appropriate amount of adult webbing clothes moths, and was preserved at 25.degree. C. and 60% humidity. Twenty-four hours (24 hrs.) later, the number of living and dead pests within the cup were surveyed. The number of eggs on the muslin wool were also surveyed by utilizing a microscope. The test was repeated.

18 The test was further carried out for a control. As the control, a muslin wool fabric free from plant oil treatment and the same procedure was utilized.

19 The results are given in the following table.

TABLE 1

utilized present oil in the test	total # of moths used	observation of cup # of dead moths	# of surviving moths	# of eggs
1. Horseradish oil	80	28	5	12
control	80	0	14	79
2. Bay oil	100	29	3	1
control	100	0	27	63
3. Basil oil	100	13	12	27
control	100	0	30	127
4. Calamus oil	100	1	18	3
control	100	0	21	104
5. Ginger oil	100	8	11	3
control	100	0	30	226
6. Palmarosa oil	100	26	1	1
control	100	0	33	195
7. Cinnamon oil	100	16	5	9

	control	100	1	27	247
8.	Ylang-ylang oil	100	0	9	30
	control	100	0	34	235
9.	Perilla oil	100	4	10	1
	control	100	0	18	96
10.	Valerian oil	100	9	9	13
	control	100	0	25	124
11.	Clove oil	100	22	0	1
	control	100	1	32	244
12.	Star anise oil	100	5	5	11
	control	100	0	26	182
13.	Milfoil oil	100	10	10	22
	control	100	0	14	106
14.	Fennel oil	100	16	7	16
	control	100	0	21	111
15.	Oregano oil	100	22	2	1
	control	100	0	21	85
16.	Angelica oil	100	3	16	8
	control	100	0	32	61

20 Test Example 2

21 2 cm.times.2 cm muslin wool fabric was impregnated dropwise with 0.1 mL of an acetone solution comprising 1% by weight of horseradish oil and was placed on the bottom of a 50 cm.sup.3 polyethylene cup. The said cup was then infested with 10 middle instar larvae, and was preserved for 3 days at 25.degree. C. and 60% humidity. The surviving and moribund test insects on or off the fabric were observed 3 days later, as well as the degree of muslin wool fabric damaged. The fed amount were given the following grades, ++++: high degree of fabric damaged +++: an average degree of the fabric damaged ++: a low degree of the fabric damaged +: a lower degree of fabric damaged -: no observable amount of fabric damaged

22 Furthermore, a control was performed with the use of a muslin wool fabric that is deficient of plant oil treatment.

23 As a result, the area treated with horseradish oil had all the test insects dead and off of the fabric and with a - grade for the degree of wool consumed. The non-treated area had all the test insects surviving and on the fabric and had a ++++ grade of wool consumed.

CLAIMS:

What is claimed is:

1. A method of protecting fabric which comprises dispersing, spraying, spreading or setting an effective amount of a plant oil selected from the group consisting of horseradish oil, calamus oil, perilla oil, valerian oil, star anise oil, milfoil oil, oregano oil and angelica oil, to places where pests invade.

2. The method of protecting fabric according to claim 1, wherein the plant oil is horseradish oil.

3. The method of protecting fabric according to claim 1, wherein the plant oil is calamus oil.

4. The method of protecting fabric according to claim 1, wherein the plant oil is perilla oil.

5. The method of protecting fabric according to claim 1, wherein the plant oil is valerian oil.

6. The method of protecting fabric according to claim 1, wherein the plant oil is star anise oil.

7. The method of protecting fabric according to claim 1, wherein the plant oil is milfoil oil.

8. The method of protecting fabric according to claim 1, wherein the plant oil is oregano oil.

9. The method of protecting fabric according to claim 1, wherein the plant oil is angelica oil.

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Search Results - Record(s) 1 through 20 of 34 returned.

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Terms	Documents
L3 AND PROTECT$	34

End of Result Set

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L4: Entry 34 of 34 File: DWPI Aug 20, 2002

DERWENT-ACC-NO: 1999-460551
DERWENT-WEEK: 200257

TITLE: Fabric protectant containing plant oil, used to protect from pests, e.g. Tinea, Anthrenus or Dermestes

INVENTOR: SUGANO, M; WATANABE, K

PATENT-ASSIGNEE:

ASSIGNEE	CODE
SUMITOMO CHEM CO LTD	SUMO
SUGANO M	SUGAI
WATANABE K	WATAI

PRIORITY-DATA: 1998JP-0035782 (February 18, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
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EP 937399 A1	August 25, 1999	E	008	A01N065/00
JP 11228323 A	August 24, 1999		004	A01N065/00
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DESIGNATED-STATES: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
US 6436150B1	February 18, 1999	1999US-0252240	
EP 937399A1	February 16, 1999	1999EP-0103046	
JP 11228323A	February 18, 1998	1998JP-0035782	
KR 99072559A	February 10, 1999	1999KR-0004691	
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US20020058074A1	September 28, 2001	2001US-0964767	

INT-CL (IPC): A01 N 65/00; A61 K 35/78; A61 L 2/16; B32 B 27/12; D06 M 13/00

ABSTRACTED-PUB-NO: EP 937399A
BASIC-ABSTRACT:

NOVELTY - Fabric protectant comprises horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove oil, star anise oil, milfoil oil, fennel oil, oregano oil or angelica oil and optionally a carrier.

USE - For protecting fabrics from pests, by spraying, dispersing, spreading or setting onto a fabric and/or to the places where pests invade (claimed). It can be used to protect against pests which damage fabrics including Tinea (e.g. Tinea translucens), Tineola (e.g. Tineola bisselliella), Attagenus (e.g. Attagenus unicolor japonicus), Anthrenus (e.g. Anthrenus verbasci), Hoffmannophila (e.g. Hoffmannophila psuedospretella), Endrosis (e.g. Endrosis sarcitrella) and Dermestes (e.g. Dermestes perunvinus).

A 1 wt.% solution of the oils in 0.1 ml acetone was impregnated into 1 cm2 muslin wool fabric, then placed in a container with a hole in it, which was itself placed within a nylon gauze cage infested with moths at 25 deg. C/ 60 % humidity. After 24 hours, the number of moths alive and dead within the container was measured, as well as the number of eggs on the wool. When bay oil was used 29/100 moths were killed, 3/100 moths survived and there was 1 egg on the wool. In a control experiment using untreated muslin fabric, 0/80 moths were dead, 14/100 survived and 79 eggs were found on the wool.
ABSTRACTED-PUB-NO:

US 6436150B
EQUIVALENT-ABSTRACTS:

NOVELTY - Fabric protectant comprises horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove oil, star anise oil, milfoil oil, fennel oil, oregano oil or angelica oil and optionally a carrier.

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US20010006685A

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USE - For protecting fabrics from pests, by spraying, dispersing, spreading or setting onto a fabric and/or to the places where pests invade (claimed). It can be used to protect against pests which damage fabrics including Tinea (e.g. Tinea translucens), Tineola (e.g. Tineola bisselliella), Attagenus (e.g. Attagenus unicolor japonicus), Anthrenus (e.g. Anthrenus verbasci), Hoffmannophila (e.g. Hoffmannophila psuedospretella), Endrosis (e.g. Endrosis sarcitrella) and Dermestes (e.g. Dermestes perunvinus).

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untreated muslin fabric, 0/80 moths were dead, 14/100 survived and 79 eggs were found on the wool.

US20020058074A

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CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: FABRIC PROTECT CONTAIN PLANT OIL PROTECT PEST TINEA

DERWENT-CLASS: C05 D22 F06 M12 P34 P73

CPI-CODES: C04-B01C1; C14-B01; C14-B04B1; C14-B04B7; D09-B; F03-C02B;

CHEMICAL-CODES:

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Fragmentation Code
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Specfic Compounds
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Chemical Indexing M1 *02*
Fragmentation Code
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Specfic Compounds
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Chemical Indexing M1 *03*
Fragmentation Code
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Chemical Indexing M1 *04*
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Chemical Indexing M1 *05*
Fragmentation Code
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Chemical Indexing M1 *16*
    Fragmentation Code
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M781 M905 P002 P340 P341 Q261 Q322
Specfic Compounds
A0IWTK A0IWTU

SECONDARY-ACC-NO:
CPI Secondary Accession Numbers: C1999-135335

Generate Collection

L4: Entry 5 of 34 File: USPT Aug 20, 2002

DOCUMENT-IDENTIFIER: US 6436150 B1
TITLE: Fabric protectant against pests

Abstract Text (1):
A fabric protectant comprising of a carrier and a plant oil selected from the group consisting of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove oil, star anise oil, milfoil oil, fennel oil, oregano oil and angelica oil, efficaciously controls fabric-related pests. In addition, a method of protecting fabric which comprises dispersing, spraying, spreading and setting an effective amount of the plant oil selected from the group given above is an excellent method to control fabric-related pests.

Brief Summary Text (2):
The present invention relates to a fabric protectant that has a plant oil as an active ingredient.

Brief Summary Text (4):
A fabric protectant is usually deployed to keep treated fabric unencumbered from certain damages. One of the damages a fabric material may encounter is related to pests. An assortment of pests are known to damage fabrics by means such as feeding upon the fabric material. Clothing may be victim to these fabric-related pests and a fabric protestant against the said fabric-related pests would be an advantage.

Brief Summary Text (6):
The objective of the present invention is to serve a fabric protectant that efficaciously controls fabric-related pests. The plant oils of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove bud oil, star anise oil, milfoil oil and fennel oil surprisingly control fabric-related pests efficaciously and, therefore, are utilized to produce the fabric protectant of the present invention.

Brief Summary Text (8):
The fabric protectant of the present invention comprises a specific plant oil. The plant oil utilized in the present invention (hereinafter, the present oil), which is selected from the group consisting of horseradish oil, bay oil, basil oil, calamus oil, ginger oil, palmarosa oil, cinnamon oil, ylang-ylang oil, perilla oil, valerian oil, clove bud oil, star anise oil, milfoil oil and fennel oil, oregeno oil and angelica oil. The plant oils utilized in the present invention are standardly essential oils. Therefore, horseradish oil can be obtained by steam distillation of horseradish (Cochlearia armoracia), bay oil can be obtained by steam distillation of bay (Pimenta racemosa) leaves, basil oil can be obtained by steam distillation of basils (Ocimum spp.), calamus oil is can be obtained by steam distillation of sweet flag (Acorus calamus) rhizomes, ginger oil can be obtained by steam distillation of ginger (Zingiber officinale), palmarosa oil can be obtained by steam distillation of rosha grass (Cymbopogon martinii), cinnamon oil can be obtained by steam distillation of cassia or cinnamon (Cinnamomum spp.) trees, scrubs, barks or leaves, ylang-ylang oil can be obtained by steam distillation of ylang-ylang (Cananga odorata) flowers, perilla oil can be obtained by steam distillation of Perilla spp. leaves, flowers or seeds, valerian oil can be obtained by steam distillation of garden heliotrope (Valeriana officinalis) rhizomes, clove oil can be obtained by steam distillation of clove (Eugenia caryophyllata) buds, stems or leaves, star anise oil can be obtained by steam distillation of star anise (Illicium verum) fruits or leaves, milfoil oil can be obtained by steam distillation of milfoil (Achillea millefolium), fennel oil can be obtained by steam distillation of wild marjoram (Origanum vulgare) and angelica oil can be obtained by steam distillation

of Angelica spp. Each present oil may be extracted from the botanical source according to the methods disclosed in Kouryou Kagaku Souran (Okuda; Hirokawa shoten publication, 1967). It is also possible to purchase plant oils from the market.

Brief Summary Text (9):
The fabric protectant sets forth efficacious activity against fabric-related pests which mainly damage fabrics. Examples or fabric related pests include Tinea such as case-bearing clothes moth (tinea translucens) and casemaking clothes moth (Tinea pellionella), Tineola such as common clothes moth and webbing clothes moth (Tineola bisselliella), Attagenus such as black carpet beetle (Attagenus unicolor japonicus) and Attagenus unicolor, Anthrenus such as varied carpe beetle (Anthrenus verbasci), Hofmannophila such as brown house mouth (Hofmannophilia pseudospretella), Endrosis such as white-shouldered house moth (Endrosis sarcitrella), and Dermestes such as hide beetle (Dermestes maculatus), larder beetle (Dermestes lardarius), Dermestes haemorrhoidalis and Dermestes perunvinus.

Brief Summary Text (10):
Formulations of the fabric protectant may comprise of carriers, in addition to the present oils, but a formulation solely comprising one or more of the present oils is also effective. Cream formulations and liquid formulations such as an aerosol, are examples of formulations that comprise a carrier. A formulation comprising resins usually comprises synthetic resins that were previously impregnated with any present oil. Furthermore, a gel formulation and formulation comprising of paper or bisques wherein the paper or bisque is previously impregnated with any present oil, are also possible formulations of the fabric protectant. Dissolving the plant oil or oils in a appropriate solvent, such as acetone, is a suitable means to impregnate the paper in formulating the formulation comprising an impregnated paper. The fabric protectant usually utilizes formulations comprising the carrier.

Brief Summary Text (18):
The present protectant may further comprise of other pesticides, pest repellents, synergists, anti-oxidants and UV-absorption agents, as well as other additional agents such as fragrances, dyes and pigments.

Brief Summary Text (20):
The fabric protectant may be utilized by dispersing, spraying, spreading or setting within any appropriate area wherein pest controlling activity is deemed necessary. Dressers, drawers, cases and closets are areas wherein a fabric-related pest may invade. Furthermore, the fabric protectant may also be utilized by wrapping clothing around the fabric protectant such as paper or resin moldings that comprise the present oils.

Detailed Description Text (17):
One-tenth milliliter (0.1 ml) of an acetone solution comprising 1% by weight of a present oil is impregnated to 1 cm.times.1 cm muslin wool fabric and the impregnated wool fabric is placed on the bottom area of a plastic cup with a volume of 60 cm.sup.3. Subsequently, a cover comprising of a 1.5 cm diameter hole was placed on the cup. The cup was then placed on the floor within a 20 cm.times.20 cm.times.28.5 cm nylon gauze cage. The cage was infested with an appropriate amount of adult webbing clothes moths, and was preserved at 25.degree. C. and 60% humidity. Twenty-four hours (24 hrs.) later, the number of living and dead pests within the cup were surveyed. The number of eggs on the muslin wool were also surveyed by utilizing a microscope. The test was repeated.

Detailed Description Text (18):
The test was further carried out for a control. As the control, a muslin wool fabric free from plant oil treatment and the same procedure was utilized.

Detailed Description Text (21):
2 cm.times.2 cm muslin wool fabric was impregnated dropwise with 0.1 mL of an acetone solution comprising 1% by weight of horseradish oil and was placed on the bottom of a 50 cm.sup.3 polyethylene cup. The said cup was then infested with 10 middle instar larvae, and was preserved for 3 days at 25.degree. C. and 60% humidity. The surviving and moribund test insects on or off the fabric were observed 3 days later, as well as the degree of muslin wool fabric damaged. The fed amount

were given the following grades, ++++: high degree of fabric damaged +++: an average degree of the fabric damaged ++: a low degree of the fabric damaged +: a lower degree of fabric damaged -: no observable amount of fabric damaged

Detailed Description Text (22):
Furthermore, a control was performed with the use of a muslin wool fabric that is deficient of plant oil treatment.

Detailed Description Text (23):
As a result, the area treated with horseradish oil had all the test insects dead and off of the fabric and with a - grade for the degree of wool consumed. The non-treated area had all the test insects surviving and on the fabric and had a ++++ grade of wool consumed.

Detailed Description Paragraph Table (1):
TABLE 1 total # of observation of cup moths used # of dead # of surviving # of utilized present oil in the test moths moths eggs 1. Horseradish oil 80 28 5 12 control 80 0 14 79 2. Bay oil 100 29 3 1 control 100 0 27 63 3. Basil oil 100 13 12 27 control 100 0 30 127 4. Calamus oil 100 1 18 3 control 100 0 21 104 5. Ginger oil 100 8 11 3 control 100 0 30 226 6. Palmarosa oil 100 26 1 1 control 100 0 33 195 7. Cinnamon oil 100 16 5 9 control 100 1 27 247 8. Ylang-ylang oil 100 0 9 30 control 100 0 34 235 9. Perilla oil 100 4 10 1 control 100 0 18 96 10. Valerian oil 100 9 9 13 control 100 0 25 124 11. Clove oil 100 22 0 1 control 100 1 32 244 12. Star anise oil 100 5 5 11 control 100 0 26 182 13. Milfoil oil 100 10 10 22 control 100 0 14 106 14. Fennel oil 100 16 7 16 control 100 0 21 111 15. Oregano oil 100 22 2 1 control 100 0 21 85 16. Angelica oil 100 3 16 8 control 100 0 32 61

Other Reference Publication (6):
BRS Comptuer Abstract Caplus 1993:488945 Okano "Nontoxic insect repellent compsitions for protecting clothes from damage by moth and other insects" JP05097618 Apr. 1993.*

Other Reference Publication (7):
Chemical Abstracts, vol. 119, No. 9, Aug. 30, 1993, Columbus, Ohio, US; abstract No. 88945, Okano, Takayoshi: "Nontoxic Insect repellent compositions for protecting clothes from damage by moth and other insects", XP002101875 * abstract * & JP 05 097618 A (Osaka Seiyaku KK, Japan).

Other Reference Publication (8):
Data Base Cropu, Plarre Et Al.: "Effects of oil of cloves and citronellol, two commercially available repellents, against the webbing clothes moth Tineola bisselliella Hum." XP002101876 * abstract * & Anz. Schaedlingskd. Planz. Umweltschutz, vol. 70, No. 3, 1997, pp. 45-50.

CLAIMS:

1. A method of protecting fabric which comprises dispersing, spraying, spreading or setting an effective amount of a plant oil selected from the group consisting of horseradish oil, calamus oil, perilla oil, valerian oil, star anise oil, milfoil oil, oregano oil and angelica oil, to places where pests invade.

2. The method of protecting fabric according to claim 1, wherein the plant oil is horseradish oil.

3. The method of protecting fabric according to claim 1, wherein the plant oil is calamus oil.

4. The method of protecting fabric according to claim 1, wherein the plant oil is perilla oil.

5. The method of protecting fabric according to claim 1, wherein the plant oil is valerian oil.

6. The method of protecting fabric according to claim 1, wherein the plant oil is star anise oil.

7. The method of protecting fabric according to claim 1, wherein the plant oil is milfoil oil.

8. The method of protecting fabric according to claim 1, wherein the plant oil is oregano oil.

9. The method of protecting fabric according to claim 1, wherein the plant oil is angelica oil.

agents to control the release rate, and thickeners may also be used. The repellent compound may be chosen from the group consisting of essential oils and active ingredients of essential oils. Essential oils are defined as any of a class of volatile oils obtained from plants and possessing the odor and other characteristic properties of the plant. The controlled-release agent comprises a compound which may be synthetic and/or natural.

Brief Summary Text (7):
The controlled-release insect repellent device is beneficial because it contains only a small amount of the active ingredient in an insect repellent composition, the active ingredient is safe for use with food, tobacco, or other consumable items, and the vapor of the active ingredient is pleasant to most who come into contact with it. Further, the controlled-release insect repellent device remains active for the desired period of time which may be variable--short to long. The active ingredient is present in the controlled-release insect repellent device in an amount such that when it is released from the device, it is non-toxic to humans and animals.

Drawing Description Text (5):
FIG. 3 shows the effect on the Indianmeal moth of exposure to an inventive controlled-release insect repellent device containing methyl salicylate;

Drawing Description Text (6):
FIG. 4 shows an example of a controlled-release insect repellent device of the present invention; and

Drawing Description Text (7):
FIG. 5 shows an example of a controlled release insect repellent device of the present invention.

Detailed Description Text (2):
The environmentally-friendly, controlled-release insect repellent device of the present invention allows for controlled release of the insect repellent thus providing an insect repellent device which will remain useful for the desired period of time and which will be safer and healthier for use in products which adults, children and animals come into contact with. The device also provides insect repellence without an odor noticeable by humans.

Detailed Description Text (3):
The present invention teaches that the rate of release of the vapor of a compound having the ability to repel insects may be adjusted by the addition of a controlled-release agent. Mixing a repellent compound with a controlled-release agent in which the active ingredient in the repellent compound is miscible allows control of the release of the vapor of the active ingredient in some cases because of the affinity of the controlled-release agent for the active ingredient. Altering the relative ratios of the repellent compound and the controlled-release agent in the insect repellent composition and choosing the type, mount, and concentration of active (e.g., essential oil) and inactive (e.g., controlled-release agent) will allow for more particularized control of the release rate. In addition, mixing additives with the repellent compound will also contribute to the control. The ability to control the release rate is a benefit of the controlled-release insect repellent device. Controlling the release rate extends the duration of the effectiveness of the insect repellent device thereby lengthening its useful life. Controlling the release rate also prevents excess exposure of the repellent compound to items in contact with or in the vicinity of the device.

Detailed Description Text (4):
The controlled-release insect repellent device has a further advantage in that it may be used to repel insect from food, tobacco, or other consumable items and may be used in either direct or indirect contact with consumable items. In addition, the device may also be used with non-consumable items, i.e., textiles and fur. The repellent compound is present in an mount such that when it is released, it is non-toxic to adults, children and animals. Control of the release rate of the repellent compound where the controlled-release insect repellent device is in contact with consumable items will allow the repulsion of insects without releasing undue odors or changing the taste of the consumable items--problems which are

undesirable in consumer products.

Detailed Description Text (5):
The insect repellent composition of the present invention is prepared by mixing a repellent compound with a controlled-release agent and, optionally, a solvent, and/or other additives to form a precursor mixture and then applying the precursor mixture to a substrate. The precursor mixture is then dried if necessary to form the insect repellent composition on the substrate. The pH of the precursor mixture which may be used is limited only by the effect upon the substrate and coating material. Preferably, the precursor mixture is dried after application to the substrate. The temperature of drying is not believed to be important, but the temperature ranges which may be used are in the range of from about -17.degree. C. to about 315.degree. C., preferably about 37.degree. C. to about 205.degree. C., most preferably about 37.degree. C. to about 150.degree. C.

Detailed Description Text (7):
The concentration of the repellent compound in the insect repellent composition after the insect repellent composition has been applied and dried on the substrate will range from about 0.1 wt. % to about 80 wt. %, preferably about 0.1 wt. % to about 40 wt. %, most preferably from about 0.1 wt. % to about 20 wt. %, (dry weight) with the balance of the insect repellent composition being the amounts of the controlled-release agent, solvent, and/or other additives which have not evaporated during the drying step.

Detailed Description Text (8):
The controlled-release agent comprises a compound which will control the rate of release of the repellent compound from the device. Any compound which is approved for use in either direct or indirect contact with food, tobacco, or other consumable items may be used as the controlled-release agent. Examples of the controlled release agent are polymers, both inorganic and organic, including natural, synthetic, and semi-synthetic organic polymers. Examples of these polymers are latex resins (e.g., styrenated acrylic resins and styrenated butadiene resins), solution acrylics, polyvinyl resins, sodium alginates, natural gums or hydrocolloids (e.g., gum arabic, sodium alginates, guar, and pectin), synthetic gums (e.g., fumeric modified resins), polyethylene waxes, wax emulsions, polymeric printing inks (e.g., special formulations such as U.V. and electron beam), polymeric aqueous foams, adhesives (e.g. cold set type, hot melt, printable heat sets and ultrasonic types, and laminating adhesives of reactive and non-reactive types;), polymeric protective coatings, primers and miscellaneous natural resin formulations (e.g., copal, zien, and protein). Examples of non-polymeric controlled-release agents which may be used are non-polymeric printing inks, non-polymeric aqueous foams, non-polymeric protective coatings, and fillers such as sawdust, clay and zolites. Other compounds not listed which allow control of the release rate of the repellent compound from the device are also contemplated.

Detailed Description Text (10):
The controlled-release agent should not detrimentally affect the properties of the substrate (e.g., by discoloring or changing the shape or strength of the substrate) or interfere with the processing of the substrate (e.g., by interfering with further coating of the substrate after application of the insect repellent composition).

Detailed Description Text (11):
The amount of the insect repellent compound present in the precursor mixture before application to the substrate to form the insect repellent composition ranges from about 0.05% to about 40%, preferably from about 0.05 to about 20%, most preferably from about 0.05 to about 10% (wet weight). The amount of insect repellent present in the insect repellent composition after application to the substrate and optional drying ranges from about 0.1% to about 80%, preferably from about 0.1% to about 40%, most preferably from about 0.1% to about 20% (dry weight). All percentages are percent by weight.

Detailed Description Text (13):
Examples of methods by which the controlled-release insect repellent device may be coated with the precursor mixture are spray nozzle, rod coater, blade coater, air knife coater, roll coater, multiple roll transfer, controlled and uncontrolled drip,

wet bath dip, curtain coater, and vacuum and non-vacuum impregnation. Where the controlled-release insect repellent device is a package, printing may be also be applied to the package. Printing methods which may be used with the invention formulation are gravure, flexographic, screen, letterpress, web offset, sheetfed offset, and ink jet.

Detailed Description Text (14):
The rate of release of the active ingredient vapor from the insect repellent composition may also be controlled by applying a directional barrier to the controlled-release insect repellent device. Such a barrier may also control the direction in which the vapor is released. The barrier material may be a part of the substrate or may be applied directly on top of the controlled-release insect repellent device. The barrier material may be made out of a foil for a complete barrier or made out of materials such as film including multilayered films, paper, coated substrates, or even applied liquid coatings of a solvent, solventless or aqueous nature for a less than complete barrier. Further examples of barriers are aluminum foil, paper, polymeric film, or layered structures thereof. Examples of polymeric films are polyethylene, polyester, polypropylene, polyvinyl alcohol, ethylvinyl alcohol, polyvinyl chloride, polyvinylidene chloride, polyvinyl acetate, and layered structures thereof. Specific barriers which have been tested are aluminum foil, polyethylene, polyester film, polypropylene film, and paper. The paper tested was coated with both aqueous and non-aqueous solvent barrier coatings.

Detailed Description Text (16):
The controlled-release insect repellent device of the present invention is intended for use in repelling insects from food, tobacco, or other consumable items. The controlled-release insect repellent device may be in direct contact with food or other consumables (e.g., a box for storing infant cereal) or in the vicinity of food (indirect contact, e.g., in a cupboard).

Detailed Description Text (18):
An experiment was done to test the efficacy of methyl salicylate as a repellent to the Indianmeal moth in the controlled-release insect repellent device of the present invention. The objectives of this study were to evaluate pure (reagent grade) methyl salicylate as a repellent; evaluate pH stabilized (reagent grade) methyl salicylate as a repellent; and evaluate two mixtures of the uncured (undried) controlled-release agent--45% solids (high solids, "H/S") and 10% solids (low solids, "L/S")--with two rates of methyl salicylate--(0.1 and 0.2 v/v) as a repellent.

Detailed Description Text (37):
An experiment was done to determine the impact of the insect repellent composition of the present invention on the invasion of packaged infant cereal (banana rice) by the Indianmeal moth. Adult moths attracted to food packages and will oviposition (lay) their eggs on them. The eggs hatch, producing larvae which then bore into the packages, leaving holes which allow exposure of the food to the environment. After feeding on the food, the larvae grow, by shedding their skin--usually 4-5 times, spin silk, go through the pupae stage, and develop into adult moths. The moth larvae will grow inside the food package to pupae and then to adult moths measuring as much as 1.25 cm (1/2 inch). ##STR1##

Detailed Description Text (38):
Preparation of Insect Repellent Composition

Detailed Description Text (39):
Precursor insect repellent compositions were prepared by mixing a controlled-release agent with a repellent compound. In some compositions, other additives were also used.

Detailed Description Text (44):
The precursor insect repellent compositions A and B were applied to paperboard by two Method A and Method B, respectively, to produce insect repellent compositions on a substrate having three different dry weight concentrations [1%, 5%, and 10% dry weight of a 0.976 kg coating/m.sup.2 paperboard surface (0.2 lbs/1000 ft.sup.2)]. As shown in FIGS. 4 and 5, the substrate consisted of paperboard 1 coated with an inner

coating of polyethylene 2 and an outer clay coating 3. The insect repellent composition 4 was applied to this substrate in either of two locations. FIG. 4 shows the result of Method A, wherein the insect repellent composition 4 was applied over the outer clay coating 3 of the carton at approximately the same time as the polyethylene coating 2 was being extruded to the inner side of the paperboard. FIG. 5 shows the result of Method B, wherein the insect repellent composition 4 was applied to the backside of the paperboard prior to the extrusion of polyethylene 2 over the backside of the paperboard (i.e., polyethylene was extruded over the insect repellent composition). Afterwards, the paperboard was converted to cartons of the type commercially used for cereal which have a polyethylene coating coveting the backside of the paperboard and a clay coating on the outside of the cereal box.

Detailed Description Text (45):
The insect repellent-treated cartons were then filled with banana rice baby cereal and sealed closed with glue.

Detailed Description Text (47):
More than six weeks after the paperboard was treated with the insect repellent composition, the cartons were exposed to the Indianmeal moth in test chambers. The treated cartons were divided into 8 groups (2 control (untreated) groups, 3 groups treated with the insect repellent composition by Method A, and 3 groups treated by Method B). One of the control groups was tested in isolation in a separate chamber while the other was placed among the treated groups.

Detailed Description Text (50):
The cartons which were placed randomly in the test chambers were sampled by pulling 6 cartons of each group at 0, 1, 2, 4, 6 and 8 weeks. The total number of cartons used was 288 cartons, of which 48 were not exposed to the insect repellent composition and the total number of larvae was about 37,500.

Detailed Description Text (54):
The results presented in Table 2 show that none of the cartons were infested during packaging and transportation as evidenced by the lack of infestation at the initiation of the test which occurred approximately two months after treatment with the insect repellent composition.

Detailed Description Text (57):
The treated cartons were infested with a single stunted larva after the 2nd and 6th weeks, but none were infested with normally developing moth larvae until after the 8th week. Furthermore, the cartons treated with the insect repellent composition containing the highest concentration of the repellent compound (10%) contained only stunted larvae after the 8th week when treated using Method B, and contained no larvae at all when treated using Method A.

Detailed Description Text (58):
The success of the insect repellent composition in preventing the infestation of the cartons is impressive in view of a number of factors. The cumulative intensity of larvae (5,600 per carton; 156 per carton at the start of the test up to 1,250 per carton at the 8th week of the test) was much higher than a packaged food carton would likely be exposed to in a normal household. In addition, over four months had elapsed from the application of the insect repellent composition to the cartons and the completion of the experiment. Finally, it was observed that when the moths were first introduced into the test chamber, they tried to escape rather than to seek out the food-containing cartons. Thus, it is likely that the infestation of the treated cartons would have been reduced, perhaps significantly, if the cartons had been tested soon after the application of the insect repellent composition, the cumulative intensity of larvae had been at a normal range, moths had not been forced to stay in the vicinity of the cartons.

Detailed Description Paragraph Table (1):
TABLE 1 Moth Response to the Controlled-release insect repellent device Exposure Time (min) 1 5 10 15 Position Number of Moths 1 2 2 3 4 Avg 2, 3, & 4 5 5 4 4 Mortality % Treated 0 0 26 35 Control 0 0 0 0

CLAIMS:

1. A controlled-release insect repellent device for repelling insects from food, tobacco, or other consumable items, comprising an insect repellent composition contacting a substrate;

wherein the insect repellent composition comprises (a) a repellent compound chosen from the group consisting of essential oils accepted for food and medical use and active ingredients of said essential oils, (b) a controlled-release agent, and optionally, (c) a solvent;

wherein the repellent compound used in the controlled-release insect repellent device is present in an amount such that it is non-toxic to humans and animals, and

wherein the controlled-release agent will control the rate of release of the repellent compound from the device such that its odor is not objectionable or noticeable by humans.

2. The controlled-release insect repellent device of claim 1 wherein the repellent compound is an essential oil.

3. The controlled-release insect repellent device of claim 1 wherein the repellent compound is present in the insect repellent composition before application to the substrate in an amount in the range of from about 0.05 to about 40% by weight.

4. The controlled-release insect repellent device of claim 3 wherein the repellent compound is present in the insect repellent composition before application to the substrate in an amount in the range of from about 0.05 to about 20% by weight.

5. The controlled-release insect repellent device of claim 1 wherein the repellent compound is present in the insect repellent composition before application to the substrate in an amount in the range of from about 0.05 to about 10% by weight.

6. The controlled-release insect repellent device of claim 1 wherein the repellent compound is present in the insect repellent composition after application to the substrate and drying in an amount in the range of from about 0.1% to about 80% by weight.

7. The controlled-release insect repellent device of claim 6 wherein the repellent compound is present in the insect repellent composition after application to the substrate and drying in an amount in the range of from about 0.1% to about 40% by weight.

8. The controlled-release insect repellent device of claim 7 wherein the repellent compound is present in the insect repellent composition after application to the substrate and drying in an amount in the range of from about 0.1% to about 20% by weight.

9. The controlled-release insect repellent device of claim 1 wherein the repellent compound is chosen from the group consisting of almond bitter oil, anise oil, basil oil, bay oil, caraway oil, cardamon oil, cedar leaf oil, celery oil, chamomile oil, cinnamon leaf oil, citronella oil, clove oil, coriander oil, cumin oil, dill oil, eucalyptus oil, fennel oil, ginger oil, grapefruit oil, lemon oil, lime oil, mint oil, parsley oil, pepper oil, rose oil, spearmint oil, sweet orange oil, thyme oil, turmeric oil, oil of wintergreen, citronellal, methyl salicylate, ethyl salicylate, propyl salicylate, citronellol, safrole, and D-limonene.

10. The controlled-release insect repellent device of claim 9 wherein the repellent compound is an active ingredient in an essential oil.

11. The controlled-release insect repellent device of claim 10 wherein the repellent compound is oil of wintergreen.

12. The controlled-release insect repellent device of claim 9 wherein the repellent

compound is methyl salicylate.

13. The controlled-release insect repellent device of claim 1 wherein the substrate is chosen from the group consisting of paper, paperboard, corrugated boxes, liners of corrugated boxes, medium of corrugated boxes, plastic, plastic sheeting, cloth and metals.

14. The controlled-release insect repellent device of claim 13 wherein the substrate is paperboard.

15. The controlled-release insect repellent device of claim 13 wherein the substrate is in the form of a container.

16. The controlled-release insect repellent device of claim 15 wherein the container contains food.

17. The controlled-release insect repellent device of claim 15 wherein the container contains tobacco.

18. The controlled-release insect repellent device of claim 1 wherein the controlled-release agent is chosen from the group consisting of polymers, non-polymeric printing inks, non-polymeric aqueous foams, non-polymeric protective coatings, and fillers.

19. The controlled-release insect repellent device of claim 18 wherein the controlled-release agent is chosen from the group consisting of latex resins, solution acrylics, polyvinyl resins, natural gums, synthetic gums, polyethylene waxes, wax emulsions, polymeric printing inks, polymeric aqueous foams, adhesives, polymeric protective coatings, primers and natural resin formulations.

20. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent is a latex resin.

21. The controlled-release insect repellent device of claim 20 wherein the controlled-release agent comprises a styrenated acrylic resin.

22. The controlled-release insect repellent device of claim 20 wherein the controlled-release agent comprises a styrenated butadiene resin.

23. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent comprises a natural or synthetic gum.

24. The controlled-release insect repellent device of claim 23 wherein the controlled-release agent comprises gum arabic.

25. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent comprises a polyethylene wax or wax emulsion.

26. The controlled-release insect repellent device of claim 1 wherein the controlled-release agent comprises an adhesive.

27. The controlled-release insect repellent device of claim 26 wherein the controlled-release agent comprises a laminating adhesive.

28. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent comprises a primer.

29. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent comprises a sodium alginate.

30. The controlled-release insect repellent device of claim 23 wherein the controlled-release agent comprises a fumeric modified resin.

31. The controlled-release insect repellent device of claim 19 wherein the controlled-release agent is copal, zien, or protein.

32. The controlled-release insect repellent device of claim 1 wherein the controlled-release agent comprises a styrenated acrylic resin, the repellent compound comprises methyl salicylate, the solvent is water, and the insect repellent composition further comprises a non-ionic polyethylene wax.

33. The controlled-release insect repellent device of claim 1 wherein the solvent is water.

34. The controlled-release insect repellent device of claim 1 further comprising a directional barrier in contact with the substrate to control the direction from which vapor from the repellent compound is released.

35. The controlled-release insect repellent device of claim 34 wherein the directional barrier comprises aluminum foil, paper, a polymeric film, or layered structures thereof.

36. The controlled-release insect repellent device of claim 35 wherein the directional barrier comprises a polymeric film chosen from the group consisting of polyethylene, polyester, polypropylene, polyvinyl alchol, ethylvinyl alcohol, or layered structures thereof.

37. A method for repelling insects from food, tobacco, or other consumable items comprising placing the controlled-release insect repellent device of claim 1 in the vicinity of food, tobacco, or other consumable items.

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L1: Entry 1 of 2 File: USPT Aug 20, 2002

US-PAT-NO: 6436150
DOCUMENT-IDENTIFIER: US 6436150 B1

TITLE: Fabric protectant against pests

DATE-ISSUED: August 20, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Sugano; Masayo	Osaka			JP

US-CL-CURRENT: 8/115.6; 424/403, 424/725, 424/733

CLAIMS:

What is claimed is:

1. A method of protecting fabric which comprises dispersing, spraying, spreading or setting an effective amount of a plant oil selected from the group consisting of horseradish oil, calamus oil, perilla oil, valerian oil, star anise oil, milfoil oil, oregano oil and angelica oil, to places where pests invade.

2. The method of protecting fabric according to claim 1, wherein the plant oil is horseradish oil.

3. The method of protecting fabric according to claim 1, wherein the plant oil is calamus oil.

4. The method of protecting fabric according to claim 1, wherein the plant oil is perilla oil.

5. The method of protecting fabric according to claim 1, wherein the plant oil is valerian oil.

6. The method of protecting fabric according to claim 1, wherein the plant oil is star anise oil.

7. The method of protecting fabric according to claim 1, wherein the plant oil is milfoil oil.

8. The method of protecting fabric according to claim 1, wherein the plant oil is oregano oil.

9. The method of protecting fabric according to claim 1, wherein the plant oil is angelica oil.

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L1: Entry 1 of 2 File: USPT Aug 20, 2002

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INVENTOR-INFORMATION:

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Sugano; Masayo	Osaka			JP

INT-CL: [07] A01 N 65/00, D06 M 13/00

US-CL-ISSUED: 8/115.6; 424/403, 424/725, 424/733
US-CL-CURRENT: 8/115.6; 424/403, 424/725, 424/733

FIELD-OF-SEARCH: 8/115.6, 424/403, 424/195.1, 424/725, 424/733

PRIOR-ART-DISCLOSED:

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PRIMARY-EXAMINER: Lilling; Herbert J.